

STATEMENT OF WORK

Low-profile Mobile Satellite Transceiving Antenna System

The following describes the minimum requirements for a low profile, roof-mounted, vehicular satellite communications antenna system that both transmits and receives in the K/Ka-bands. The terminal shall be able to acquire and track a geosynchronous satellite while in vehicular motion. The antenna system shall maintain beamwidth and sidelobe performance in accordance with Intelsat antenna radiation pattern specifications for operation with geosynchronous satellites.

The system shall accept a high power transmit waveform up to 30 MHz wide at Ka-band (frequencies specified below), and output a block down-converted signal in the commercial L-band between (950 – 1450 MHz). The center frequency of the block of bandwidth converted shall be user selectable within the entire band specified below. It is understood that the provided LNB will not cover the entire K/Ka-band spectrum supported by the antenna system.

The terminal shall operate successfully (transmit and receive simultaneously) with a satellite while the vehicle is under motion over improved roadways at speeds up to 55 mph. The antenna system is to be flush mounted on the roof of the vehicle compartment. The vendor should include resources to accommodate shock and vibration for improved and unimproved roads. Signal absorption material is permitted to meet OSHA standards for personnel working adjacent to and below the unit.

The control unit for the terminal shall display current azimuth, elevation, location (lat/long) and heading, and accommodate standard inputs for GPS (NMEA), L-band signal (for tracking), and heading information. The control unit shall be set up for remote control/monitoring via an RS-232 port. The control unit shall operate from within the vehicle and shall not be integrated into the outside antenna system unit.

Operating frequencies of the antenna must be between:

RF Transmit: 27.5 – 30.2 GHz

RF Receive: 18.5 – 20.2 GHz

IF Receive: 950 – 1450 MHz

Gain: 45 dB min. transmit
41 dB min. receive

Maximum main lobe beamwidth, = 1.1 degrees across transmit band
Pointing accuracy = 0.5 dB peak, 0.2 dB RMS

Noise Temperature, receive LNB: 90 deg Kelvin

Polarization: LHCP/RHCP

Maximum dimensions, system & enclosure: 72 in by 72 in. by 24-in. (H)

Prime Power: 120 VAC

Connectors:

Tx input: Must be either WR-28 or WR-34

Rx output: Must be L-band, type-N connector

Antenna pointing:

Azimuth: 360 degrees continuous, no cable wrapping

Elevation: Must be between 15 to 65 degrees (at least)

Environmental:

Operational temp: -10 deg C to +50 deg C (at least)

Wind load: 90 mph (at least)

Angular motion: Pitch: +/- 10 deg (at least)

Roll: +/- 15 deg (at least)

Yaw: +/- 3 deg (at least)

Turning rate: 36 deg/second (at least)

The terminal system with controller is to be delivered and demonstrated to NRL within 12 months ARO. There shall be a preliminary design review, a critical design review and periodic progress reviews with the sponsor, and the system is to be tested as a minimum for the following operational parameters:

Complete set of antenna patterns (at different azimuth/elevation angles)

Shock and vibration

Cross polarization isolation

Axial ratios (at different azimuth/elevation angles)

Tracking while stationary and under motion consistent with angular motion specifications listed above

NRL will provide the heading reference unit for the antenna system, and provide support for its integration with the antenna system.

The completed terminal shall be provided with operation and installation documentation, as well as all test results needed to document antenna performance and support certification. A list of documentation to be delivered shall be provided in the proposal.